

Flywheel Energy Storage for Lunar Rovers & Other Small Spacecraft, Phase I

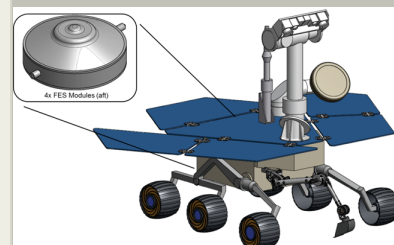
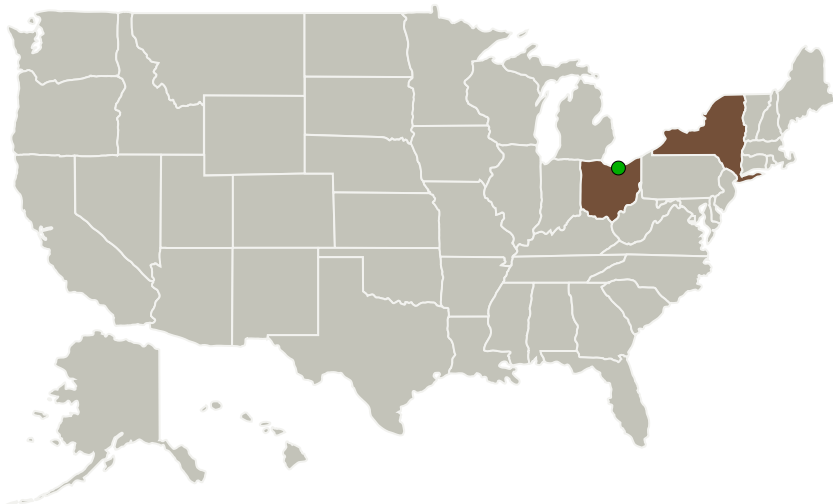
Completed Technology Project (2014 - 2014)



Project Introduction

NASA continues to be interested in returning to the Lunar surface. The Lunar surface is a harsh and unforgiving environment. Perhaps most challenging is the drastic and length thermal cycle surface equipment will experience on the surface. Standard spacecraft electronics and batteries cannot survive the extremes of the Lunar thermal cycle and must be protected by a thermal control system (TCS) that often features Plutonium-238 which is an expensive, strictly controlled material that is not a viable option for lower cost or commercial missions. An alternative approach would be an extreme environment flywheel energy storage system that could supply enough power to heat the critical electronics during the Lunar night. Honeybee Robotics Spacecraft Mechanisms Corporation (Honeybee) proposes to develop an extreme environment Flywheel Energy Storage (FES) system that enables a small spacecraft (e.g., 200 kg Lunar Rover) to repeatedly survive the long, cold Lunar night. The FES system will also supply operational power during the Lunar day.

Primary U.S. Work Locations and Key Partners



Flywheel Energy Storage for Lunar Rovers & Other Small Spacecraft Project Image

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Organizations Performing Work	Role	Type	Location
Honeybee Robotics, Ltd.	Lead Organization	Industry	Pasadena, California
● Glenn Research Center(GRC)	Supporting Organization	NASA Center	Cleveland, Ohio

Primary U.S. Work Locations	
New York	Ohio

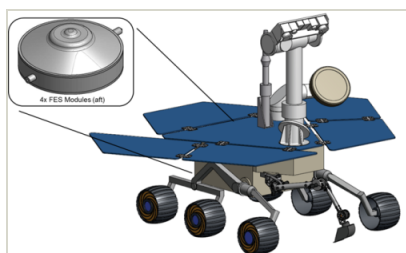
Project Transitions

**June 2014:** Project Start**December 2014:** Closed out

Closeout Documentation:

- Final Summary Chart(<https://techport.nasa.gov/file/137490>)

Images



Project Image

Flywheel Energy Storage for Lunar Rovers & Other Small Spacecraft
Project Image
(<https://techport.nasa.gov/image/132590>)

Organizational Responsibility

Responsible Mission Directorate:

Space Technology Mission Directorate (STMD)

Lead Organization:

Honeybee Robotics, Ltd.

Responsible Program:

Small Business Innovation Research/Small Business Tech Transfer

Project Management

Program Director:

Jason L Kessler

Program Manager:

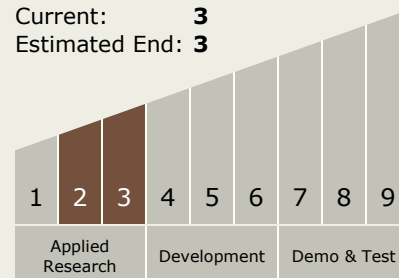
Carlos Torrez

Principal Investigator:

Erik Mumm

Technology Maturity (TRL)

Start: 2
Current: 3
Estimated End: 3



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Technology Areas

Primary:

- TX03 Aerospace Power and Energy Storage
 - └ TX03.2 Energy Storage
 - └ TX03.2.3 Advanced Concepts for Energy Storage

Target Destinations

The Sun, Earth, The Moon, Mars, Others Inside the Solar System, Outside the Solar System